DEPARTMENT OF PUBLIC SAFETY

M.G.L. c. 146 and 522 CMR:
Boiler Installation and Inspection Requirements

Fall 2016

Introductions

Edward S. Kawa, Jr.

Chief of Inspections–Mechanical
edward.kawa@MassMail.State.MA.US

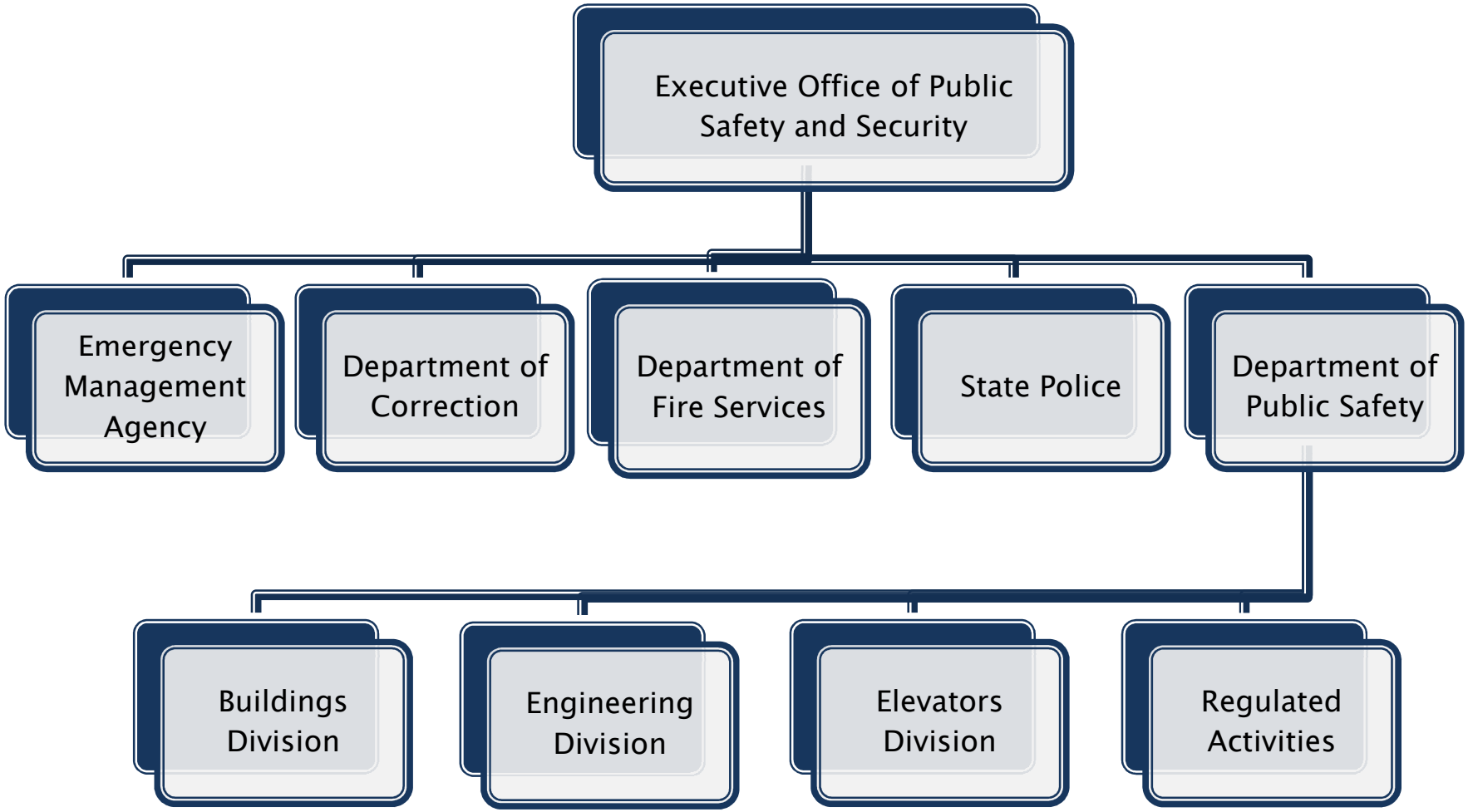
David Vandal

District Engineering Inspector
david.vandal@state.ma.us

Cesar I. Lastra

Technical Code Coordinator – Engineering
cesar.lastra@state.ma.us

Who are we?


Executive Office of Public Safety and Security
Emergency Management Agency
Department of Correction
Department of Fire Services
State Police
Department of Public Safety
Buildings Division
Engineering Division
Elevators Division
Regulated Activities

Who are we?

Engineering Division

Edward S. Kawa, Jr. Chief of Inspections-Mechanical

District Engineering Supervisors

Daniel Kilburn & Henry Geryk

District Engineering Inspectors

Allen Boston	Patrick Kane	Joseph Pineyro
Francis Bucchiere	Craig Kimball	Robert Schultz
William Dougherty	Daniel Laperle	George Streeter
Richard Feeney	John Lawrence	Mark Sullivan
David Gosselin	Brian Logan	David Vandal
Jeffrey Isabelle	Steve Lorusso	Jeff Winn

Who are we?

The District Engineering Inspectors are located in 16 districts throughout the 351 cities and towns in the Commonwealth. Each district is designed by geographic location and the number of registered pressure vessels contained within the district.

The Department's Main Office is in Boston and there are (3) three additional satellite offices located in Milford, Springfield, and Tewksbury.

What do we do?

The Engineering Division is responsible for the first inspection of all steam boilers and air tanks, the periodic inspections of boilers and pressure vessels in State owned facilities, and may be requested to perform inspections on hot water boilers and refrigeration equipment with over 10 tons of refrigerant by uninsured customers.

Inspections include those required by MGL c. 146 for private and public buildings such as power plants, hospitals, nursing homes and schools.

What do we do?

The Engineering Division is responsible for license applications review and examinations of over 47,000 licensed individuals throughout the Commonwealth

What else do we do?

Compliance of the following professions:

- Stationary Engineering – Power Plant & Boiler Operators
- Pipefitting
- Sprinklerfitting
- Oil Burners
- Refrigeration
- Nuclear Power Engineering
- Hydraulic or Hoisting Engineering
- Horse and Carriage operations
- Amusements Inspection and Maintenance Mechanics

What else do we do?

- The Engineering Division performs periodic compliance inspections to determine that individuals are licensed and operating safely.
- We perform compliance investigations related to complaints received by the Department.
- We perform Accident and Incident investigations.
- We exam all licensed individuals at (5) five locations once a month in Charlestown, Amherst, Devens, Milford and Taunton every month excluding December.

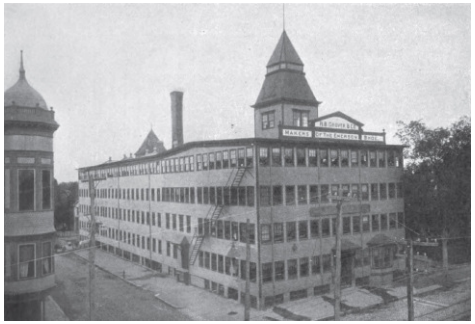
Board of Boiler Rules

March 20, 1905

R.B. Grover & Co. shoe factory in Brockton, MA catches fire as a result of a boiler explosion.

- 58 Killed
- 150 Injured

The disaster triggers the development of boiler safety laws and the Massachusetts Board of Boiler Rules.



Pictures from the History of the Brockton Relief Fund by Abert F. Pierce

Board of Boiler Rules
(MGL c. 22 § 10)

Chief of Inspections–Mechanical	Edward S. Kawa, Jr.
Representing Operating Engineers	Ray Archambault
Representing Boiler Users	Anthony Lucia
Representing Boiler Manufacturers	Charles Perry
Representing Insurers of Boilers	Leah Francis

The Board of Boiler Rules shall formulate or adopt rules formulated by a recognized engineering organization for the construction, installation and inspection of steam Boilers and power reactor vessels and piping as used in atomic energy installations and for ascertaining the safe working pressure to be carried therein; prescribe tests, if it deems it necessary, to ascertain the qualities of materials used in the construction of Boilers, power reactor vessels and piping; formulate rules regulating the construction and sizes of safety valves for Boilers of different sizes and pressures, appliances for indicating the pressure of steam and the level of water in the Boiler or power reactor vessel, and such other appliances as the Board may deem necessary to safety in operating steam Boilers or power reactor vessels; and make a standard form of Certificate. (M.G.L. c. 146, § 2)

Board of Boiler Rules

Massachusetts General Laws: Chapter 146

Section 2 – Rules in general; prescription of tests; form of certificate of inspection; assistance of attorney general

Section 6 – Annual inspection; extension of time; first inspection (Steam Boilers)

Section 7 – Boilers excepted from inspections

Section 8 – Necessity of inspection; issuance, display and accessibility of certificate

Section 13 – Persons authorized to inspect boilers

Section 23 – Certificate of inspection; prerequisites; necessity

Section 34 – Necessity of certificate of inspections; exceptions (Air Tanks)

Section 36 – Inspections (Air Tanks)

Section 45A – Necessity of certificate of inspection; exceptions; inspections; reports; prohibition of operation; fees; rules and regulations; penalty (Refrigeration)

Section 70 – Inspection of hot water heating boilers; changes in rules for construction of new boilers

Section 71 – Unlawful operation of boilers; certificate of inspection; identification number; inspection fees (Hot Water Heating Boilers)

522 CMR: Board of Boiler Rules

- **CHAPTER 1.00**: GENERAL PROVISIONS
- **CHAPTER 2.00**: POWER BOILERS
- **CHAPTER 3.00**: POWER REACTOR VESSELS AND PIPING AND UNFIRED PRESSURE VESSELS AS USED IN ATOMIC ENERGY INSTALLATIONS
- **CHAPTER 4.00**: HEATING BOILERS AND OTHER HEAT STORAGE SOURCES
- **CHAPTER 7.00**: AIR TANKS
- **CHAPTER 9.00**: REFRIGERATION AND AIR CONDITIONING SYSTEMS
- **CHAPTER 10.00**: MATERIAL SPECIFICATIONS
- **CHAPTER 11.00**: WELDING SPECIFICATIONS
- **CHAPTER 12.00**: FIBERGLASS-REINFORCED PLASTIC PRESSURE VESSELS
- **CHAPTER 15.00**: NATIONAL BOARD INSPECTION CODE
- **CHAPTER 16.00**: CONTROLS AND SAFETY DEVICES FOR AUTOMATICALLY FIRED BOILERS (ASME CODE CSD-1), PART CW: STEAM AND WATERSIDE CONTROL
- **CHAPTER 17.00**: PIPING
- **CHAPTER 18.00**: CONTINUING EDUCATION REQUIREMENTS
- **CHAPTER 19.00**: PORTABLE BOILERS

* The following chapters are 'Reserved': Chapter 5; Chapter 6; Chapter 8; Chapter 13; Chapter14.

522 CMR: Board of Boiler Rules

Standards Adopted

ANSI/ASHRAE
15 Safety Standard for Refrigeration Systems
34 Designation and Safety Classification of Refrigerants

ANSI/ASME Code for Pressure Piping, B31
B31.1 Power Piping
B31.3 Process Piping
B31.5 Refrigeration Piping and Heat Transfer Components
B31.9 Building Service Piping

ASME CSD-1 Controls and Safety Devices for Automatically Fired Boilers
Part CW Steam and Waterside Control

National Board Inspection Code
Part 1 Installation
Part 2 Inspection
Part 3 Repairs and Alterations

National Fire Prevention Association
NFPA 85 Boiler and Combustion Systems Hazards Code

ASME Boiler and Pressure Vessel Code
Section I Rules for Construction of Power Boilers
Section II Materials
- Part A – Ferrous Materials Specifications
- Part B – Nonferrous Materials Specifications
- Part C – Specifications for Welding Rods Electrodes and Filler Metals
- Part D – Properties

Section III Rules for Construction of Nuclear Facility Components
Section IV Rules for Construction of Heating Boilers
Section VIII Rules for Construction of Pressure Vessels
Section IX Welding and Brazing Qualifications
Section X Fiber-Reinforced Plastic Pressure Vessels
Section XI – Division 1 Rules for Inservice Inspection of Nuclear Power Plant Components

Boiler Installation and Inspection Requirements

MGL c.146 & 522 CMR Applies to the Following

Power Boilers

- Water Pressures exceeding 160 PSIG or 250°F; Steam pressures exceeding 15 PSIG
- Built in accordance with ASME BPVC I
- First inspection performed by District Engineering Inspector

Heating Boilers

- Water Pressures not exceeding 160 PSIG or 250°F; Steam pressures not exceeding 15 PSIG
- Built in accordance with ASME BPVC IV
- First inspection performed by District Engineering Inspector or Authorized Insurance Inspector **(Water Boilers or Heat Storage Sources)**
- First inspection performed by District Engineering Inspector **(Steam Boilers)**

Boiler Installation and Inspection Requirements

Boilers Excepted from Inspections

- On railroad locomotives, motor vehicles or steam fire engines brought into the Commonwealth for temporary use in times of emergency.
- Used in private residences.
- Used for heating purposes which carry pressures not exceeding fifteen pounds to the square inch (15 psi) and have less than four square feet of grate surface.
- Boilers of not more than three horse power. (3 hp.)
- Under the jurisdiction of the United States.
- Used exclusively for horticultural or agricultural purposes.

* MGL c. 146 § 7 – Boilers excepted from inspections

Boiler Installation and Inspection Requirements

MGL c.146 & 522 CMR Applies to the Following

Air Tanks

- Design MAWP greater than 50 PSI;
  Internal diameter greater than 6 in.; or
  Internal volume greater than 1 cu. ft.
- Built in accordance with ASME BPVC VIII
- First inspection performed by District Engineering Inspector

Does not apply to the following tanks:

- Subject to Federal control.
- Attached to locomotives, street cars, railway cars, trackless trolley vehicles, or to motor vehicles or body lifting apparatus.
- Air is used solely for cushioning systems containing water or other liquids.
- Containing air & liquids in which the pressure is maintained by pumps.
- Used by divers if inspected by the refilling agency.
- Containing compressed air for breathing purposes while combating fires or used in rescue operations in contaminated areas; and storage tanks & mechanical filling systems used to fill these tanks.
- Used in and as part of electrical substations owned & operated by an electric company, as defined M.G.L. c. 164, § 1.

Boiler Installation and Inspection Requirements

MGL c.146 & 522 CMR Applies to the Following

Refrigeration & Air Conditioning Systems

- Systems of 20 Refrigeration Tons or greater (240,000 BTU/hr.)
- Built in accordance with ASHRAE 15
- First inspection performed by District Engineering Inspector or Authorized Insurance Inspector

Does not apply to the following systems:

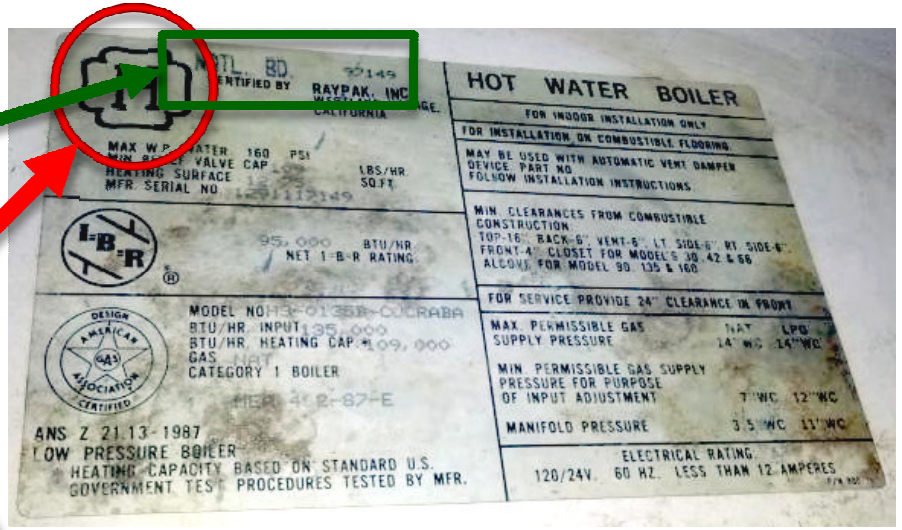
- Railway trains, motor vehicles.
- Private residences, apartment houses of less than five apartments.
- Located on property under the jurisdiction of the United States government.
- Used exclusively for agricultural, horticultural or floricultural purposes.
- Having less than twenty (20) tons capacity.

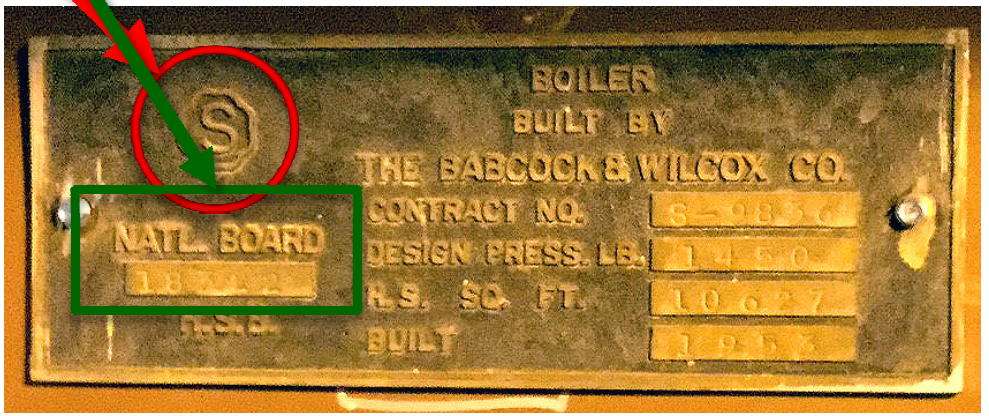
Boiler Installation and Inspection Requirements

Boiler Data Plate

National Board Number

ASME Code Stamp





Boiler Installation and Inspection Requirements

First Inspection by DPS District Engineering Inspector

* MGL c. 146 § 24 & 522 CMR 1.04(c)(1)

Boiler Installation and Inspection Requirements

Certificate of Inspection

CERTIFICATE OF INSPECTION
BOILER or PRESSURE VESSEL

Type **HW**

Tag Number **MA162208**

Located at:

(RRI) Red Roof Inn #10274
60 Forbes Blvd
Mansfield, MA 02048-1146

Pressure not to exceed **125** **lbs/sq. in.**

NB# **327534**

Manufacturer **Raypak**

Expiration Date : **May-2017**

Owner or User:

(RRI) Red Roof Inn #10274
605 S Front St
Columbus, OH 43215-5777
ATTN: ATTN: Adam Ramirez Licenses & Permits

THE COMMONWEALTH OF MASSACHUSETTS
DEPARTMENT OF PUBLIC SAFETY
One Ashburton Place, Rm 1301
Boston, MA 02108-1618

This is to certify that the pressure vessel herein has been inspected and approved for use in accordance with the provisions of M.G.L., Chapter 146.

Notify this department at once if any defect is discovered.

POST UNDER GLASS IN CONSPICUOUS PLACE IN ENGINE OR BOILER ROOM OR NEXT TO PRESSURE VESSEL.

Inspector

Matt Carlin
Commissioner, Department of Public Safety

Pipefitting

The installation, repair, replacement, maintenance or alteration of any apparatus for piping appliances, devices or accessories for heating systems having a rating greater than seven hundred thousand [700,000] British Thermal Units including apparatus and piping for the general use of conveyance of steam and associated pumping equipment, vacuum and pneumatic systems, oil and petroleum products, ice making machinery, air conditioning equipment, piping systems used for the conveyance and storage of Category M liquids, as defined in *ANSI/ASME B 31.3 Process Piping* and high pressure systems over 150 pound-force per square inch gauge or hazardous industrial type gasses used in processes, biopharma or semi-conductor manufacturing.

Pipefitting shall not include sheet metal work, refrigeration systems, and boilers and plumbing as defined under 248 CMR: *Board of State Examiners of Plumbers and Gas Fitters* promulgated under M.G.L. c. 142, §§ 4 and 13.

* MGL c. 146 § 81 & 528 CMR 2.02

Pipefitting

Power, Heating, & Cooling Piping (PHCP) Pipefitting

Steam, condensate or hot water piping, including apparatus, appliances, devices or accessories for piping, when the rated input capacity of the primary or secondary loop of the heating system is greater than 700,000 Btu's per hour within the scope of *ANSI/ASME Pressure Piping, B31.1 Power Piping, B31.3 Process Piping, or B31.9 Building Services*; or secondary coolant piping loops in air conditioning and refrigeration systems having a capacity of ten tons or greater for use in industrial, institutional, commercial and public buildings.

* 528 CMR 2.02: Definitions

Pipefitting

Process Piping Pipefitting

Pipefitting as enumerated in M.G.L. c. 146, § 81, including Category M fluid service, High Pressure Fluid Service, Normal Fluid Service, and Category D Fluid Service.

ASME B31.3: Process Piping applies to the piping found in petroleum refineries; chemical, pharmaceutical, textile, paper, semiconductor, and cryogenic plants; and related processing plants and terminals for all fluids, including:

- raw, intermediate, and finished chemicals
- petroleum products
- gas, steam, air, and water
- fluidized solids
- refrigerants
- cryogenic fluids

* 528 CMR 2.02: Definitions

Pipefitting

Process Piping Pipefitting

ASME B31.3: Process Piping does not apply to the following conditions:

a) Piping systems designed for internal gage pressures less than 105 kPa (15 psi), provided the fluid handled is nonflammable, nontoxic, and not damaging to human tissues and its design temperature is from −29°C (−20°F) through 186°C (366°F)

b) Power boilers in accordance with BPVC Section I and boiler external piping required to conform to B31.1

c) Tubes, tube headers, crossovers, and manifolds of fired heaters that are internal to the heater enclosure

d) Pressure vessels, heat exchangers, pumps, compressors, and other fluid handling or processing equipment, including internal piping and connections for external piping

Pipefitting

MGL c. 146 § 87: Pipefitters, Inapplicability of Provisions

The provisions of sections eighty-one [81] to eighty-six [86], inclusive, relative to the examining and licensing of pipefitters shall not apply to pipefitting performed by a person regularly in the employ of an industrial plant, firm corporation, college, gas company, electric company engaged in the generation, sale, transmission or distribution of electricity, or a utility steam distribution system as may be required on the premises and property of such industrial plant, firm corporation, hospital, school, college, gas company, electric company or utility steam distribution system, nor shall such provisions apply to such pipefitting performed by an Engineer or Fireman, licensed under section forty-six [46], in a place where he is regularly employed.

Civil Fines

The Engineering Division issues warnings and monetary fines for violations of 522 CMR and 528 CMR.

Those found guilty will receive a *warning or fine.

- First offense – fine of up to $1000.00
- Second offense – $1000.00 up to $3000.00
- Third offense – $3000.00 up to $5000.000

* Warnings and fines remain on file for (3) three years

Notification/Investigation

In the event of a Reportable Accident/Incident, that results in Serious Injury/Illness or Damage exceeding $10,000 per incident, the Owner/User or the Engineer in Charge shall notify the **Massachusetts Emergency Management Agency (MEMA)** at **(508) 820-1444** within **24 HOURS** of the event.

www.mass.gov/dps

Any Questions?